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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,680	01/20/2004	John C. Morfitt III	P17969-US2	3137

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EXAMINER	
STOFFREGEN, JOEL	
ART UNIT	**PAPER NUMBER**
2626	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/761,680	MORFITT ET AL.	
	Examiner	Art Unit	
	Joel Stoffregen	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/20/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the original application filed on 01/20/2004.

2. Claims 1-21 are currently pending in this application. Claims 1, 7, 13, and 18 are independent claims.

Priority

3. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on 01/20/2004 is being considered by the examiner.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. **Claims 1-21** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claimed invention is seeking patent protection of a mathematical algorithm in abstract. The claimed invention is not a

practical application of this algorithm by physical transformation, and the claimed invention does not use the algorithm to produce a useful, concrete, and tangible result.

7. The mapping of a number from one domain (PESQ) to another (MOS) is nothing more than a mathematical manipulation of a number, similar to any other mapping operation (e.g. converting Cartesian coordinates to polar coordinates, or plotting frequencies on a logarithmic scale). This is not eligible for patent protection. Additionally, due to the limited scope of the equation, a practical application of the mapping function "in practical effect would be a patent on the abstract idea itself." (see MPEP 2106).

8. **Claims 7-12 and 15** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims recite a processing unit implementing a method. A processor alone cannot implement a method. In order to be patentable subject matter, a program must cause a computer to execute a method that is tangibly embodied on a computer readable medium.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

10. **Claims 1, 4, 6, 7, 10, 12-15, 17-19, and 21** are rejected under 35 U.S.C. 102(a) as being anticipated by **Cotanis ("Impacting Factors on the Objective Measurement Algorithms for Speech Quality Assessment on Mobile Networks")**.

11. Regarding **claim 1**, Cotanis teaches a method for estimating the subjective quality of a speech signal ("obtain an objective estimator for the MOS value", section I, paragraph 2) transmitted through a wireless network ("wireless domain", abstract), said method comprising the step of:

analyzing the speech signal using an objective voice quality method ("objective speech quality evaluation", section I, paragraph 3); and

mapping a score output from the objective voice quality method into a mean opinion score domain ("map the objective result to the MOS scale", section I, paragraph 2) using a logistic function ("mapping is accomplished using a logistic function", section III, paragraph 5) that has the form:

$y = 1 + 4/(1 + \exp(-1.7244 * x + 5.0187))$ (see equation (1), it is a more general form of the given equation) where

x = the score from said objective voice quality method ("output of the algorithms", section III, paragraph 5) which is in the range of -0.5 to 4.5 (see section I, paragraph 3, PESQ is one of the algorithms used, which has a range of –0.5 to 4.5);

y = the mapped score that is in the MOS domain ("mapping to the MOS scale", section II, paragraph 9) which is in the range of 1 to 5 ("subjective scale 1...5", section III, paragraph 5).

12. Regarding **claim 4**, Cotanis further teaches that the objective voice quality method is a Perceptual Evaluation of Speech Quality (PESQ) method (see section I, paragraph 3, PESQ is one of the algorithms used).

13. Regarding **claim 6**, Cotanis further teaches that the mapped score is suitable for a field measurement tool ("real time field measurement world, the objective measures turn out to be more suitable", abstract).

14. Regarding **claim 7**, Cotanis teaches a processing unit ("signal processing", section I, paragraph 1) for estimating the subjective quality of a speech signal ("obtain an objective estimator for the MOS value", section I, paragraph 2) transmitted through a wireless network ("wireless domain", abstract) by analyzing the speech signal using an objective voice quality method ("objective speech quality evaluation", section I, paragraph 3) and mapping a score output from the objective voice quality method into a mean opinion score domain ("map the objective result to the MOS scale", section I, paragraph 2) using a logistic function ("mapping is accomplished using a logistic function", section III, paragraph 5) that has the form:

$y = 1 + 4/(1 + \exp(-1.7244 * x + 5.0187))$ (see equation (1), it is a more general form of the given equation) where

x = the score from said objective voice quality method ("output of the algorithms", section III, paragraph 5) which is in the range of -0.5 to 4.5 (see section I, paragraph 3, PESQ is one of the algorithms used, which has a range of –0.5 to 4.5);

y = the mapped score that is in the MOS domain ("mapping to the MOS scale", section II, paragraph 9) which is in the range of 1 to 5 ("subjective scale 1...5", section III, paragraph 5).

15. Regarding **claim 10**, Cotanis further teaches that the objective voice quality method is a Perceptual Evaluation of Speech Quality (PESQ) method (see section I, paragraph 3, PESQ is one of the algorithms used).

16. Regarding **claim 12**, Cotanis further teaches that the processing unit is used in a measurement tool ("real time field measurement", abstract) that determines the speech quality of the wireless network ("how these measures perform in the wireless domain", abstract).

17. Regarding **claim 13**, Cotanis teaches a method for estimating a voice quality of a wireless network ("how these measures perform in the wireless domain", abstract) comprising the steps of:

receiving a degraded speech signal that was transmitted through the wireless network ("corresponding output signal after its transition through the network under test", section I, paragraph 1);

using an objective voice quality method ("objective speech quality evaluation", section I, paragraph 3) and a logistic function ("mapping is accomplished using a logistic function", section III, paragraph 5) to compare the degraded speech signal ("output signal") with a reference speech signal ("reference pattern", section I, paragraph 1) and output an estimated mean opinion score ("map the objective result to the MOS scale", section I, paragraph 2) which is an indication of the subjective quality of the degraded speech signal ("function of the subjectively determined MOS", section I, paragraph 2) which in turn is an indication of the voice quality of the wireless network ("figure of merit that describes the speech quality", section I, paragraph 2);

wherein said objective voice quality method outputs a score in the range of -0.5 to 4.5 (see section I, paragraph 3, PESQ is one of the algorithms used, which has a range of –0.5 to 4.5) which is converted into the estimated MOS which is in the range of 1.0 to 5.0 ("subjective scale 1...5", section III, paragraph 5) by the logistic function ("mapping is accomplished using a logistic function", section III, paragraph 5) that has the form:

$y = 1 + 4/(1 + \exp(-1.7244 * x + 5.0187))$ (see equation (1), it is a more general form of the given equation) where

x = the score from said objective voice quality method (x is a well-known input);

y = the estimated MOS (y is a well-known output).

18. Regarding **claim 14**, Cotanis further teaches that a wireless voice transceiving device ("phone", section V, paragraph 6) is used to receive the degraded speech signal ("output signal").

19. Regarding **claim 15**, Cotanis further teaches that a processor ("signal processing", section I, paragraph 1) is used to implement the objective voice quality method and the logistic function so as to compare the degraded speech signal with the reference speech signal and output the estimated MOS (see rejection of claim 13 above).

20. Regarding **claim 17**, Cotanis further teaches that the objective voice quality method is a Perceptual Evaluation of Speech Quality (PESQ) method (see section I, paragraph 3, PESQ is one of the algorithms used).

21. Regarding **claim 18**, Cotanis teaches a measurement device ("real time field measurement", abstract) for estimating a voice quality of a wireless network ("how these measures perform in the wireless domain", abstract) comprising:

a receiving unit ("use two signals as their input", section I, paragraph 1) for receiving a degraded speech signal that was transmitted through the wireless network ("corresponding output signal after its transition through the network under test", section I, paragraph 1);

a processing unit ("signal processing", section I, paragraph 1) that uses an objective voice quality method ("objective speech quality evaluation", section I, paragraph 3) and a logistic function ("mapping is accomplished using a logistic function", section III, paragraph 5) to compare the degraded speech signal ("output signal") with a reference speech signal ("reference pattern", section I, paragraph 1) and output an estimated mean opinion score ("map the objective result to the MOS scale", section I, paragraph 2) which is an indication of the subjective quality of the degraded speech signal ("function of the subjectively determined MOS", section I, paragraph 2) which in turn is an indication of the voice quality of the wireless network ("figure of merit that describes the speech quality", section I, paragraph 2);

wherein said objective voice quality method outputs a score in the range of -0.5 to 4.5 (see section I, paragraph 3, PESQ is one of the algorithms used, which has a range of –0.5 to 4.5) which is converted into the estimated MOS which is in the range of 1.0 to 5.0 ("subjective scale 1...5", section III, paragraph 5) by the logistic function ("mapping is accomplished using a logistic function", section III, paragraph 5) that has the form:

$y = 1 + 4/(1 + \exp(-1.7244 * x + 5.0187))$ (see equation (1), it is a more general form of the given equation) where

x = the score from said objective voice quality method (x is a well-known input);

y = the estimated MOS (y is a well-known output).

22. Regarding **claim 19**, Cotanis further teaches that the receiving unit is a wireless voice transceiving device ("phone", section V, paragraph 6) and said processing unit is a processor ("signal processing", section I, paragraph 1).

23. Regarding **claim 21**, Cotanis further teaches that the objective voice quality method is a Perceptual Evaluation of Speech Quality (PESQ) method (see section I, paragraph 3, PESQ is one of the algorithms used).

Claim Rejections - 35 USC § 103

24. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

25. **Claims 2, 5, 8, 11, 16, and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Cotanis ("Impacting Factors on the Objective Measurement Algorithms for Speech Quality Assessment on Mobile Networks")** in view of **Rix (ITU-T SG12, D.86)**.

26. Regarding **claims 2, 8, 16, and 20**, Cotanis teaches all the of claimed limitations of claims 1, 7, 13, and 18 on which they depend.

However, Cotanis does not specifically disclose the definition of the MOS scale.

In the same field of speech quality measurement, Rix teaches the definition of the MOS domain scale (see Rix, page 3, Table 1: Listening quality scale).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the MOS scale as taught by Rix as the MOS scale in the measurement method of Cotanis so that the standard scale is used.

27. Regarding **claims 5 and 11**, Cotanis teaches all the of claimed limitations of claims 1 and 7 on which they depend.

However, Cotanis does not specifically disclose the shape of the logistic function.

In the same field of speech quality measurement, Rix teaches a function that maps PESQ scores "closely to listening quality MOS" (Cotanis, section I, paragraph 2) and produces an S-curve with a shape that has an asymptotic lower end, a nearly linear mid-section and an asymptotic upper end (see Figure 2: Relationship between PESQ score and PESQ-LQ).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to plot the mapped data as taught by Rix using the MOS calculation method of Cotanis so that the quality of the mapping can be seen.

28. **Claims 3 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Cotanis ("Impacting Factors on the Objective Measurement Algorithms for Speech Quality Assessment on Mobile Networks")** in view of **"How Non Linear Regression Works" (http://web.archive.org/web/20001021170849/...**

http://www.graphpad.com/curvefit/how_nonlin_works.htm) (herein after referred to as Graphpad).

29. Regarding **claims 3 and 9**, Cotanis teaches all the of claimed limitations of claims 1 and 7 on which they depend.

However, Cotanis does not specifically disclose how the coefficients for the logistic function are determined.

In the same field of mapping functions, Graphpad teaches coefficients ("calculate the best-fit values of Bmax and Kd", Graphpad, paragraph 8) that were determined by using a Gauss-Newton method ("Gauss-Newton method", Graphpad, paragraph 8).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the Gauss-Newton method of Graphpad to calculate the coefficients for the logistic function of Cotanis to "improve the fit" of the curve (Graphpad, paragraph 8).

Conclusion

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Beerends et al. ("Perceptual Evaluation of Speech Quality, the new ITU standard for end-to-end speech quality assessment. Part II – Psychoacoustic model"), ITU-T Recommendation P.862.1, and Beerends (Pub No.: US 2005/0159944) teach methods of measuring speech quality.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joel Stoffregen whose telephone number is (571) 270-1454. The examiner can normally be reached on Monday - Friday, 9:00 a.m. - 6:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JS

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